

REMARKS

Claims 1, 4-6, 8-10 and 15 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-4 and 9-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takizawa (U.S. Pat. No. 6,357,849) in view of Yoshiyama et al. (U.S. No. 2002/0140750). This rejection is respectfully traversed. Notwithstanding, claims 2, 3, 11 and 12 are cancelled. Claim 1 is amended based on original claim 2 and 3. Claim 10 is amended based on claims 11 and 12. No new matter is added.

Claim 1 calls for a device manufacturing apparatus having:

(a) "a controller for executing a detection operation by said detector during loading and unloading operations of said substrate, said loading and unloading operations being made by replacing a first substrate being the substrate currently supported on the stage with a second substrate being another substrate currently not supported on the stage"; and

(b) "said controller performs calibration of said receiver before execution of a nozzle detection operation".

Claim 10 calls for a device manufacturing method having:

(c) "a detection step of detecting said discharge condition, during said carrying step in which a first substrate being the substrate currently positioned at the first

position is replaced with a second substrate being another substrate currently not positioned on the first position"; and

(d) "calibration of said receiver is performed before execution of a nozzle detection operation".

With the above feature (a) or (c), the claimed invention provides a device manufacturing apparatus and device manufacturing method which can perform detection of non-performing nozzles without a decrease in throughput.

In addition, with the above feature (b) or (d), the claimed invention obtains reliable detection accuracy (refer to "When performing a detection operation of non-performing nozzles a plurality of times, there are cases where the receiving sensitivity of the receiver, or the output signal value become different for each of the non-performing nozzle detections due for example to the temperature (heat) of the receiver or to noise attributable to the surrounding equipment (noise generating sources). In this case, *by performing calibration of the receiver at a predetermined timing, such as for example before each execution of the non-performing nozzle detection operation, the detection accuracy of the receiver can be improved*" on page 4, lines 7 to 14, in the original specification of the present application).

The Office Action asserts that the above features (b) and (d) that correspond to the subject matter of original claims 3 and 12 are disclosed in column 8, lines 3 to 8 of Takizawa et al. In column 8, lines 3 to 8 of Takizawa et al., it is mentioned that "The circuit structure shown in FIG. 4 includes a control circuit 740, a determination circuit

741 that determines abnormality of ejection, a *sampling circuit 742 that samples a detection signal output from the light receiver 708 at fixed cycles*, and a timer 743 that counts the time”.

The Applicant respectfully asserts that “the sampling circuit 742” of Takizawa et al. fails to perform the “calibration” of the claimed invention.

That is, Takizawa et al. describes the functions of the sampling circuit 742 in the ink jet recording apparatus as follows.

“When the ink jet print head 701 further shifts in the main scanning direction to the position shown in FIG. 9, an ink droplet ejected from a nozzle #5 passes through the light flux 730. At this moment the quantity of light detected by the light receiver 708 decreases from the level of the observed quantity of light under the condition that no ink droplet passes through the light flux 730, in the same way when the nozzle #6 passes through the light flux 730. The detection signal output from the light receiver 708 accordingly has an output variation at the time when the nozzle #5 passes through the light flux 730 (see FIG. 6). *If the ink ejection is detected and the detection signal output P1 changes (at step S507), the sampling circuit 742 then carries out sampling at the timing of the sampling signal shown in FIG. 6.* At step S508, the determination circuit 741 adds the value ‘1’ to the ejecting nozzle count register N, that is, registers a value ‘2’ into the ejecting nozzle count register N.

With a further shift of the ink jet print head 701 in the main scanning direction, the detection is successively carried out in the sequence of a nozzle #4, a nozzle #3, a nozzle #2, and a nozzle #1 as shown in FIG. 10.

When detection of the nozzle #1 is completed and the value registered in the ejecting nozzle count register N is equal to 6, which is identical with the total number of nozzles, the printing operation starts immediately at step S510. If the nozzle #3, for example, fails, however, the value registered in the ejecting nozzle count register N is equal to 5. *In the case where the value of the ejecting nozzle count register N is not equal to the total number of nozzles at step S509 and the count of the timer 743 exceeds a preset time period at step S511, which is sufficient to allow all the nozzles to pass through the light flux 730 after the detection of the nozzle #1, the determination circuit 741 determines that there is a nozzle that fails ink ejection. Based on the result of the determination, the control circuit 740 stops the shift of the ink jet print head 701 in the main scanning direction and starts an operation required for recovery of the nozzle at step S512. In the case where all the nozzles fail ink ejection at step S504, the determination circuit 741 also determines the failure of ink ejection at step S513, based on the count of the timer 743. The control circuit 740 also stops the shift of the ink jet print head 701 and starts an operation for the recovery at step S512*" (from column 8, line 45 to column 9, line 21, in Takizawa et al.).

These descriptions clearly indicate that the sampling circuit 742 is used for detecting abnormal nozzles but is **not** used for calibrating the light receiver 708. Accordingly, Takizawa et al. fails to disclose the above features (b) and (d), and therefore cannot obtain the above-mentioned advantageous effect (i.e., "the detection accuracy of the receiver can be improved"). Therefore, Takizawa cannot form the basis of an obviousness rejection.

Accordingly, the Applicant believes that the currently amended claims 1 and 10 are novel and non-obvious over Takizawa et al., in view of Yoshiyama et al., and therefore should be allowable. In addition, the Applicant also believes that dependent claims 4 and 9 should also be allowable due to their dependency on allowable claim 1.

Claims 5 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takizawa (U.S. Pat. No. 6,357,849) in view of Yoshiyama et al. (U.S. Pub. No. 2002/0140750) and further in view of Bruch et al. (U.S. Pat. No. 6,814,422). This rejection is respectfully traversed.

The Applicant respectfully submits that dependent claims 5 and 8 should be allowable due to their dependency on allowable claim 1.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Takizawa (U.S. Pat. No. 6,357,849) in view of Yoshiyama et al. (U.S. Pub. No. 2002/0140750) and further in view of Hah (U.S. Pat. No. 6,371,590). This rejection is respectfully traversed.

The Applicant respectfully submits that dependent claim 6 should be allowable due to its dependency on allowable claim 1.

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Takizawa (U.S. Pat. No. 6,357,849) in view of Yoshiyama et al. (U.S. Pub. No. 2002/0140750) and further in view of Cleary (U.S. Pat. Pub. No. 2002/0149660). This rejection is respectfully traversed. Notwithstanding, claim 15 is amended.

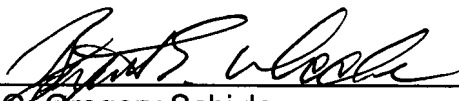
Claim 15 is amended based on claims 11 and 12. No new matter is added. The Applicant respectfully submits that the currently amended claim 15 should be allowable for the same reasons as set forth above regarding currently amended claims 1 and 10.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: May 9, 2007

By: 
G. Gregory Schivley
Reg. No. 27,382
Bryant E. Wade
Reg. No. 40,344

HARNESS, DICKY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

[GGS/BEW/pvd]